No. 8900293

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Wisconsin Agricultural Experiment Station

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF eighteen YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. THE UNITED STATES SEED OF THIS VARIETY (1) SHALL BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED AND (2) SHALL CONFORM TO THE NUMBER OF GENERATIONS REQUIRED BY THE OWNER OF THE RIGHTS. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

WHEAT

'Merrimac'

In Testimony Whereof, *I have hereunto set my hand and caused the seal of the* Plant Variety Protection Office *to be affixed at the City of* Washington, D.C. *this* 30th *day of* November *in the year of our Lord one thousand nine hundred and* ninety-two.

Attest:

Kenneth H. Evans
Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Edward Madigan
Secretary of Agriculture

APPROVAL EXPIRES 2-28-88

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions on reverse)

FORM APPROVED: OMB NO. 0581-0055

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S)
Wisconsin Agricultural Experiment Station

2. TEMPORARY DESIGNATION
X1336-8 (Wis. Sel. No.)

3. VARIETY NAME
Merrimac

4. ADDRESS *(Street and No. or R.F.D. No., City, State, and Zip Code)*
Agricultural Hall
University of Wisconsin-Madison
Madison, WI 53706

5. PHONE *(Include area code)*
608-262-2349
608-262-0246

FOR OFFICIAL USE ONLY

PVPO NUMBER 8900293

6. GENUS AND SPECIES NAME
Triticum aestivum L. em Thell.

7. FAMILY NAME *(Botanical)*
Gramineae

FILING
DATE Aug. 21, 1989
TIME 9:30 [X] A.M. [ ] P.M.

8. KIND NAME
Wheat

9. DATE OF DETERMINATION
October 5, 1988

FEES RECEIVED
AMOUNT FOR FILING
$ 1800. + 350.
DATE Aug. 21, 1989, Sept. 25, 1989
AMOUNT FOR CERTIFICATE
$ 250.00
DATE Nov. 9, 1992

10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION *(Corporation, partnership, association, etc.)*
Wisconsin Agricultural Experiment Station

11. IF INCORPORATED, GIVE STATE OF INCORPORATION
NA

12. DATE OF INCORPORATION

13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS
Dr. Robert A. Forsberg, Dept. of Agronomy, University of Wisconsin-Madison, 1575 Linden Dr., Madison, WI 53706

PHONE *(Include area code)*: 608-262-0246

14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED

a. [X] Exhibit A, Origin and Breeding History of the Variety *(See Section 52 of the Plant Variety Protection Act.)*
b. [X] Exhibit B, Novelty Statement.
c. [X] Exhibit C, Objective Description of Variety *(Request form from Plant Variety Protection Office.)*
d. [X] Exhibit D, Additional Description of Variety.
e. [X] Exhibit E, Statement of the Basis of Applicant's Ownership.

15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? *(See Section 83(a) of the Plant Variety Protection Act.)* [X] Yes *(If "Yes," answer items 16 and 17 below)* [ ] No

16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?
[X] Yes [ ] No

17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?
[X] Foundation [X] Registered [X] Certified

18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.?
[ ] Yes *(If "Yes," give date)*
[X] No

19. HAS THE VARIETY BEEN RELEASED, OFFERED FOR SALE, OR MARKETED IN THE U.S. OR OTHER COUNTRIES?
RELEASED TO WISCONSIN (USA) GROWERS OF CERTIFIED SEED - OCTOBER 1988.
[X] Yes *(If "Yes," give names of countries and dates)*
[ ] No

20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in Section 41, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF APPLICANT
Robert A. Forsberg
Robert A. Forsberg

DATE
August 15, 1989

SIGNATURE OF APPLICANT

DATE

1

FORM LS-470 (3-86) *Edition of 7-84 obsolete.*

14A. Exhibit A, Origin and Breeding History of Merrimac Wheat.

Merrimac Soft Red Winter Wheat
Wisconsin selection X1336-8

The pedigree of Merrimac is:

Dual/C.I. 13250/2/2*H614a-11-5-5-4

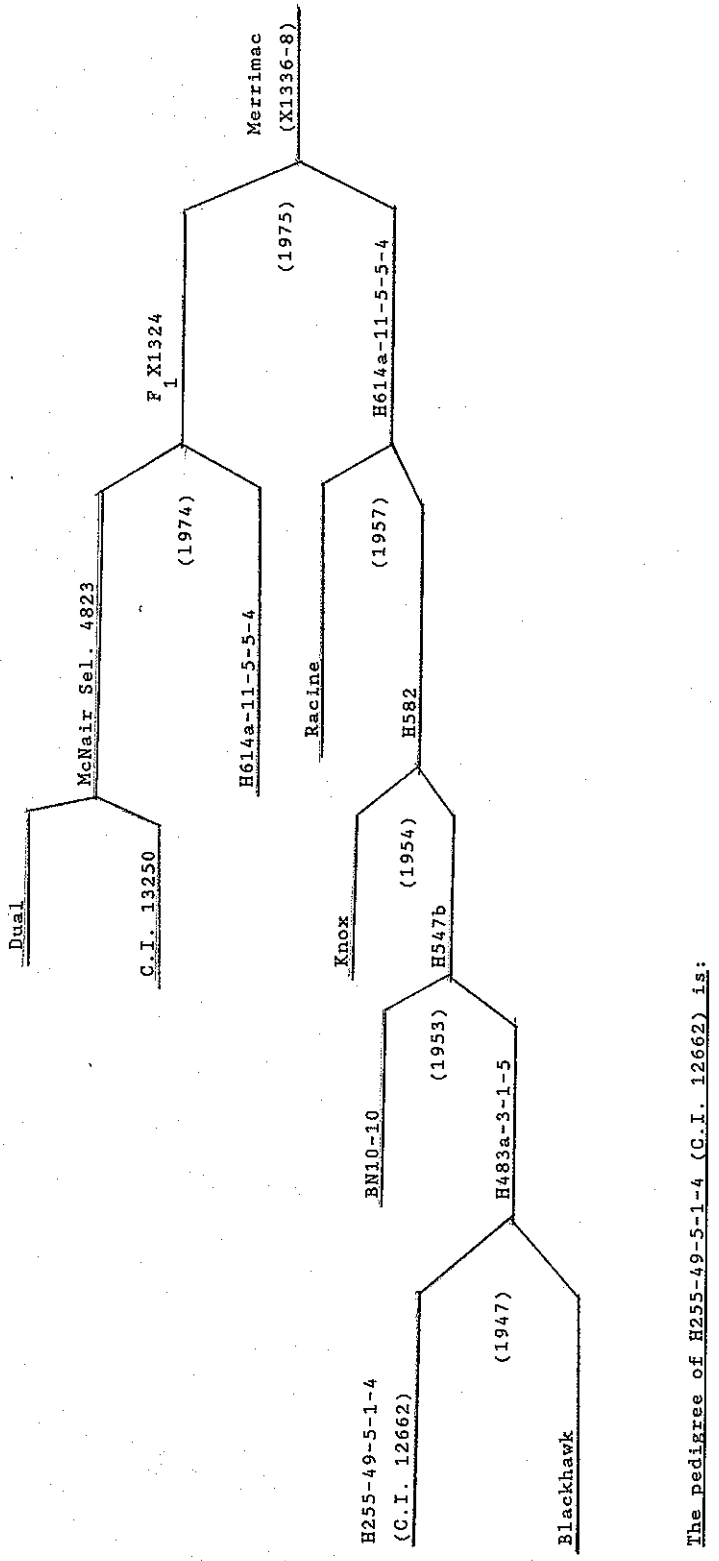
where H614a = Racine/3/Knox/2/BN10-10/H483a-3-1-5

where BN10-10 = Brevor Norin 10-10 and

H483a = C.I. 12662 x Blackhawk

The extended pedigree and chronology of crosses are outlined on the following page:

Exhibit A. (Cont.), page 2.



The pedigree of H255-49-5-1-4 (C.I. 12662) is:

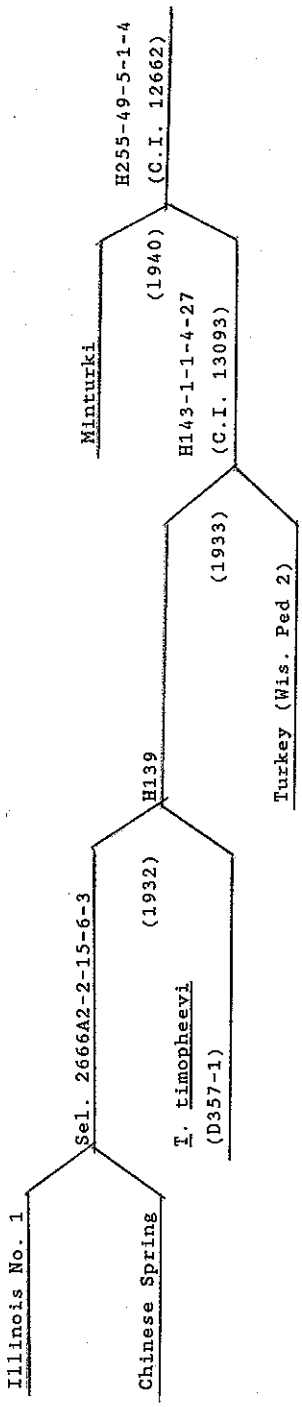


Exhibit A. (Cont.), page 3.

Merrimac was developed by workers in the Department of Agronomy, University of Wisconsin-Madison, Madison, Wisconsin. The final cross, made in the field nursery in 1975, was a first backcross of selection H614a-11-5-5-4 onto F_1 X1324. The backcross F_1, designated Wisconsin cross X1336, was grown in 1976, the F_2 population in 1977, and F_3 lines from F_2 selections in 1978. Lines in the F_4 and F_5 generations were evaluated in 1979 and 1980, respectively. One of the 1981 F_6 lines was harvested in bulk and further tested as Wisconsin selection X1336-8, and this selection ultimately became Merrimac.

Selection X1336-8 was evaluated in a preliminary yield trial in 1982, in the main Madison Nursery Performance Trial (four replicates) starting in 1983, and in the statewide Wisconsin Agricultural Research Station's tests in 1984 and in 1986 to the present time. Selection X1336-8 was tested as Entry No. 7 in the 1987 Uniform Eastern Soft Red Winter Wheat Performance Nursery.

The primary selection criteria in the F_2 population and in the F_3 through F_6 generations were winterhardiness, resistance to leaf and stem rust, stiff straw, productive agronomic appearance, and good soft-wheat grain quality as indicated by endosperm softness.

Monitored closely in all performance trials were grain yield, test weight, winterhardiness, straw strength, response to diseases, and milling and baking quality. Starting with the 1982 crop, seed of X1336-8 has been submitted annually to the USDA Soft Wheat Quality Laboratory, Wooster, Ohio, for milling and baking tests.

No plant or seed variants were detected in Merrimac prior to the release of foundation seed. The original foundation seed production field was inspected by the breeder (R. A. Forsberg) and by foundation program field inspectors. Merrimac has demonstrated stability for all phenotypic and genotypic characteristics consistent with normal environmental influences. Merrimac is a typical Wisconsin self-pollinated soft red winter wheat cultivar in that it is bearded, intermediate in plant height, and late in maturity.

Breeders seed of X1336-8 was increased in 1987, foundation seed was produced in 1988, and foundation seed was released to growers of certified seed in Wisconsin in October 1988. Certified seed of Merrimac will be available for planting by farmers in fall 1989.

14B. Exhibit B, Novelty Statement.

The variety of wheat most similar to Merrimac is Argee. Merrimac differs uniquely and specifically from Argee as follows:

1. Merrimac is resistant to bunt while Argee is susceptible.

2. Merrimac is susceptible to loose smut while Argee is resistant.

3. Merrimac is highly resistant (nearly immune) to stem rust while Argee is only moderately resistant.

4. Merrimac has a higher degree of resistance to leaf rust than does Argee.

5. Kernels of Merrimac are consistently 1 mm shorter than those of Argee, and kernels of Merrimac are nearly always 6 mm in length.

6. The glume shoulder of Merrimac is obique while the glume shoulder of Argee is elevated.

7. The crease of Merrimac (Class 1) is narrower than the crease of Argee (Class 2).

Data supporting these differences between Merrimac and Argee are presented below. Data for Dynasty, a relatively new, bearded cultivar from Ohio, are also included. Other soft red winter wheats grown in Wisconsin are Caldwell (from Indiana) and Cardinal (from Ohio) but both are beardless types.

Yield, agronomic, and disease data from Merrimac, Argee, and Dynasty soft red winter wheats from performance trials conducted at Madison and Arlington, Wisconsin during 1987, 1988, and 1989.

	Grain yield b/a		Madison								
	Arl. Drill Plots	Mad.	Bu. wt. lbs. 1/	Winter surv. %	Head date	Plant ht. in.	Snap-back 6.0=weak 9.0=very stiff	Leaf rust 0-100	Stem rust 0=resis. 9=susc.	Bunt %	Smut % 2/
Merrimac	67.7	65.1	58.7	95.8	6/3.0	38.0	7.7	1.4	0.0	6.7	45.2
Argee	63.4	62.2	56.3	95.2	6/4.0	38.4	7.5	3.9	2.7	34.5	9.7
Dynasty	74.7	73.0	59.0	91.0	5/30.2	34.9	8.1	40.9	0.0	56.2	--

1/ Average for 1987 and 1988.
2/ Average for 1983 through 1987.

5

Exhibit B. (Cont.), page 2.

In addition to the differences between Merrimac and Argee listed earlier, Merrimac has higher grain yield and test weight averages. Merrimac and Argee are similar in winterhardiness (hardy), heading date (late), and plant height (taller than other currently-grown cultivars -- Caldwell, Cardinal, and Dynasty).

Merrimac has good resistance to bunt while Argee is susceptible. Average infection readings in 8 artificial tests at Madison during 1982 through 1989 were:

Bunt Infection (%)	
Merrimac	Argee
5.0	31.6

FORM APPROVED: OMB NO. 40-R3822

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
LIVESTOCK, POULTRY, GRAIN & SEED DIVISION
BELTSVILLE, MARYLAND 20705

EXHIBIT C
(Wheat)

OBJECTIVE DESCRIPTION OF VARIETY
WHEAT (*TRITICUM SPP.*)

INSTRUCTIONS: *See Reverse.*

NAME OF APPLICANT(S): Wisconsin Agricultural Experiment Station (Robert A. Forsberg, Agent)

ADDRESS *(Street and No. or R.F.D. No., City, State, and ZIP Code)*: Agricultural Hall, University of Wisconsin-Madison, Madison, WI 53706

FOR OFFICIAL USE ONLY
PVPO NUMBER: 8900295
VARIETY NAME OR TEMPORARY DESIGNATION:

Place the appropriate number that describes the varietal character of this variety in the boxes below.
Place a zero in first box (e.g. [0][8][9] or [0][9]) when number is either 99 or less or 9 or less.

1. KIND:
[1] 1 = COMMON 2 = DURUM 3 = EMMER 4 = SPELT 5 = POLISH 6 = POULARD 7 = CLUB

2. TYPE:
[2] 1 = SPRING 2 = WINTER 3 = OTHER *(Specify)* _____ [1] 1 = SOFT 2 = HARD 3 = OTHER *(Specify)* _____

[2] 1 = WHITE 2 = RED 3 = OTHER *(Specify)* _____

3. SEASON - NUMBER OF DAYS FROM EMERGENCE TO:
[2][4][6] FIRST FLOWERING [2][5][2] LAST FLOWERING

4. MATURITY *(50% Flowering)*:
[0][0] NO. OF DAYS *EARLIER* THAN ... ARGEE 1/ ..... [ ] 1 = ARTHUR 2 = SCOUT 3 = CHRIS
[0][6] NO. OF DAYS *LATER* THAN ..... CALDWELL 1/ ..... [ ] 4 = LEMHI 5 = NUGAINES 6 = LEEDS

5. PLANT HEIGHT *(From soil level to top of head)*:
[0][9][8] CM. HIGH
[1][4] CM. TALLER THAN ..... CALDWELL 1/ ..... [ ]
[0][0] CM. SHORTER THAN ..... ARGEE 1/ ..... [ ] 1 = ARTHUR 2 = SCOUT 3 = CHRIS 4 = LEMHI 5 = NUGAINES 6 = LEEDS

6. PLANT COLOR AT BOOTING *(See reverse)*:
[2] 1 = YELLOW GREEN 2 = GREEN 3 = BLUE GREEN

7. ANTHER COLOR:
[1] 1 = YELLOW 2 = PURPLE

8. STEM:
[1] Anthocyanin: 1 = ABSENT 2 = PRESENT
[2] Waxy bloom: 1 = ABSENT 2 = PRESENT
[1] Hairiness of last internode of rachis: 1 = ABSENT 2 = PRESENT
[1] Internodes: 1 = HOLLOW 2 = SOLID
[0][4] NO. OF NODES *(Originating from node above ground)*
[1][7] CM. INTERNODE LENGTH BETWEEN FLAG LEAF AND LEAF BELOW

9. AURICLES:
[1] Anthocyanin: 1 = ABSENT 2 = PRESENT
[1] Hairiness: 1 = ABSENT 2 = PRESENT

10. LEAF:
[2] Flag leaf at booting stage: 1 = ERECT 2 = RECURVED 3 = OTHER *(Specify)*: _____
[2] Flag leaf: 1 = NOT TWISTED 2 = TWISTED
[1] Hairs of first leaf sheath: 1 = ABSENT 2 = PRESENT
[2] Waxy bloom of flag leaf sheath: 1 = ABSENT 2 = PRESENT
[1][1] MM. LEAF WIDTH *(First leaf below flag leaf)*
[2][4] CM. LEAF LENGTH *(First leaf below flag leaf)*:

FORM LPGS-470-6 (3-79) (Formerly Form GR-470-6 (2-73), which may be used)

1/ None of the six listed check cultivars is grown in Wisconsin.

(over)

8900293

11. HEAD:

[1] Density: 1 = LAX 2 = DENSE

[4] Shape: 1 = TAPERING 2 = STRAP 3 = CLAVATE 4 = OTHER *(Specify)* Oblong

[4] Awnedness: 1 = AWNLESS 2 = APICALLY AWNLETED 3 = AWNLETED 4 = AWNED

[1] Color at maturity: 1 = WHITE 2 = YELLOW 3 = PINK 4 = RED 5 = BROWN 6 = BLACK 7 = OTHER *(Specify)*: _____

[1][0] CM. LENGTH [1][0] MM. WIDTH

12. GLUMES AT MATURITY:

[3] Length: 1 = SHORT *(CA. 7 mm.)* 2 = MEDIUM *(CA. 8 mm.)* 3 = LONG *(CA. 9 mm.)*

[3] Width: 1 = NARROW *(CA. 3 mm.)* 2 = MEDIUM *(CA. 3.5 mm.)* 3 = WIDE *(CA. 4 mm.)*

[2] Shoulder shape: 1 = WANTING 2 = OBLIQUE 3 = ROUNDED 4 = SQUARE 5 = ELEVATED 6 = APICULATE

[3] Beak: 1 = OBTUSE 2 = ACUTE 3 = ACUMINATE

13. COLEOPTILE COLOR:

[1] 1 = WHITE 2 = RED 3 = PURPLE

14. SEEDLING ANTHOCYANIN:

[1] 1 = ABSENT 2 = PRESENT

15. JUVENILE PLANT GROWTH HABIT:

[2] 1 = PROSTRATE 2 = SEMI-ERECT 3 = ERECT

16. SEED:

[1] Shape: 1 = OVATE 2 = OVAL 3 = ELLIPTICAL

[1] Cheek: 1 = ROUNDED 2 = ANGULAR

[2] Brush: 1 = SHORT 2 = MEDIUM 3 = LONG

[1] Brush: 1 = NOT COLLARED 2 = COLLARED

[5] Phenol reaction *(See Instructions)*: 1 = IVORY 2 = FAWN 3 = LT. BROWN 4 = BROWN 5 = BLACK

[3] Color: 1 = WHITE 2 = AMBER 3 = RED 4 = PURPLE 5 = OTHER *(Specify)* _____

[0][6] MM. LENGTH [0][3] MM. WIDTH [3][7] GM. PER 1000 SEEDS

17. SEED CREASE:

[1] Width: 1 = 60% OR LESS OF KERNEL 'WINOKA' 2 = 80% OR LESS OF KERNEL 'CHRIS' 3 = NEARLY AS WIDE AS KERNEL 'LEMHI'

[1] Depth: 1 = 20% OR LESS OF KERNEL 'SCOUT' 2 = 35% OR LESS OF KERNEL 'CHRIS' 3 = 50% OR LESS OF KERNEL 'LEMHI'

18. DISEASE: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

[2] STEM RUST *(Races)* _____ [2] LEAF RUST *(Races)* _____ [0] STRIPE RUST *(Races)* _____ [1] LOOSE SMUT

[2] POWDERY MILDEW [2] BUNT [ ] OTHER *(Specify)* _____

19. INSECT: (0 = Not Tested, 1 = Susceptible, 2 = Resistant)

[0] SAWFLY [0] APHID *(Bydv.)* [0] GREEN BUG [0] CEREAL LEAF BEETLE

[ ] OTHER *(Specify)* _____ HESSIAN FLY RACES: [0] GP [0] A [0] B [0] C [0] D [0] E [0] F [0] G

20. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED:

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant tillering	Argee	Seed size	Argee
Leaf size	"	Seed shape	"
Leaf color	"	Coleoptile elongation	"
Leaf carriage	"	Seedling pigmentation	"

INSTRUCTIONS

GENERAL: The following publications may be used as a reference aid for the standardization of terms and procedures for completing this form:

(a) L.W. Briggle and L. P. Reitz, 1963, Classification of Triticum Species and Wheat Varieties Grown in the United States, Technical Bulletin 1278, United States Department of Agriculture.

(b) W.E. Walls, 1965, A Standardized Phenol Method for Testing Wheat Seeds for Varietal Purity, contribution No. 28 to the handbook of seed testing prepared by the Association of Official Seed Analysts. *(See attachment.)*

LEAF COLOR: Nickerson's or any recognized color fan should be used to determine the leaf color of the described variety.

14D. Exhibit D. Additional Description of Merrimac.

Merrimac is classified as Triticum aestivum L. em Thell. Plants are intermediate in height and moderately stiff, with long leaves consisting of blade, ligule, and sheath, all of which are glabrous. Stems are hollow. Spikes are more lax than dense, long, and nearly uniform in width the length of the spike (oblong). Glumes are glabrous, long, and wide with an acuminate beak and an oblique shoulder. The lemma of each floret terminates in a beard, and the caryopsis (seed) threshes free from the lemma and palea. Seeds are relatively large and ovate with rounded cheeks and a mid-sized to large germ. The crease is narrow, i.e. less than 60% of kernel width. Crease depth, from the crest of the cheeks to the position where the crease is closed, is shallow. The brush is short to medium and is not collared. Seeds are red, and straw is light yellow to white at maturity.

Merrimac is a soft red winter wheat. In Wisconsin it will be planted in September and October, and it will produce 3 to 5 seedling leaves during a typical Wisconsin fall season. Following vernalization during the winter months, growth resumes in early to late April. Merrimac has an average heading date of June 5 at Madison and of June 13 at Ashland in extreme northern Wisconsin.

Grain Quality. Tests conducted by the USDA Soft Wheat Quality Laboratory (Wooster, Ohio) indicate that Merrimac has very good to excellent soft wheat quality. Quality scores for grain from performance tests conducted at Madison and Arlington, Wisconsin are tabulated below. In these tests, Argee was used as the standard. Argee is known nationwide for setting an extremely high quality standard.

Quality Scores

	Milling	Baking	Milling	Baking
1872 Trips	A	A	B	D
1983 RRYT	B	A	B	A
1984 RRYT	A	A	D 1/	B
1985 RRYT	A	A	B	C
1986 RRYT	A	A	B	A
1986 Arl.	A	A	C	A
1987 Trips	A	A	B	B
1987 Arl.	A	A	D 1/	C
1988 RRYT	(Data not yet received)			
1988 Arl.	(" " " ")			

1/ Merrimac received milling scores of "D" in 1984 and 1987 for below-average flour yields.

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Exhibit D. (Cont.), page 2.

Merrimac (X1336-8) ranked first for grain quality among 36 entries in the 1987 USDA Uniform Eastern Soft Red Winter Wheat Performance Nursery. The tabulation below appeared in the 1987 USDA Annual Report.

1987 CROP UNIFORM EASTERN RED NURSERY
(RANKED BY COMBINED QUALITY SCORE)

VARIETY	1987	1986	1985	1984	1983	1982
WIX 1336-8	→1					
KNOX 62	2	13	14	18	9	1
OH 285	3	7				
PACER	4					
PIONEER 2555	5					
COKER 86-38	6					
OH 262	7					
NA-SW-84-345	8					
COKER 86-30	9					
OH 286	10					
IN 79404-G1-26-2	11					
RX 850040	12					
IL 82-2986	13	27				
MD 73065-03	14					
MD 73025-51	15					
COKER 86-35	16					
LINCOLN	17	15	7			
PS 840061	18					
IN 77249-RC1-133-3	19					
TWAIN	20	24	30			
MD 73019-28	21					
COKER 9733	22					
AGC-107	23					
AR 42263-8	24					
DYNASTY	25	5				
OASIS	26	22	22	14	4	18
KY 83-60	27	20				
NA-SW-84-157	28					
AGC-108	29					
AR 74107-F11-4	30					
IL 83-3298	31					
IL 81-3737	32					
MD 75191-80	33					
IN 771454-C1-2-9	34					
PS 840024	35					
TRUMBULL	36	32	35	34	28	25

Part of Exhibit D:
Merrimac Release Statement

University of Wisconsin-Madison

Department of Agronomy
1575 Linden Drive
Madison, Wisconsin 53706
608-262-1390

DATE: October 17, 1988

TO: Agronomy Department Chairmen, North Central Region, and Soft Red Winter Wheat Cooperators

FROM: R. A. Forsberg, Chairman, Department of Agronomy, University of Wisconsin-Madison

SUBJECT: Release of Soft Red Winter Wheat X1336-8 (Merrimac)

The Wisconsin Agricultural Experiment Station plans to release soft red winter wheat selection X1336-8 for planting by certified seed growers this current fall (1988). The name "Merrimac" has been proposed in recognition of the historical village and ferry crossing on the Wisconsin River just north of Madison in Sauk County.

The pedigree of Merrimac is:

McNair selection/4/2 * Racine/3/Knox/2/BN10-1/H483a-3-1-5

Components of the extended pedigree of H483a include Blackhawk (C.I. 12218), Minturki 6155, Turkey WI Ped. 2, Illinois No. 1, Chinese, and Triticum timopheevi.

Merrimac has been evaluated as X1336-8 in advanced performance trials in Wisconsin since 1983. It was included as entry no. 7 in the 1987 Uniform Eastern Soft Red Winter Wheat Nursery. It is similar to Argee in maturity (late), plant height (tall), and straw strength (good). The advantages of Merrimac over Argee are equal or higher grain-yield averages, higher test weight, and improved disease resistance. The new cultivar has excellent winter hardiness, has wide adaptation in Wisconsin, and it has excellent milling and baking quality. Merrimac follows the pattern of other Wisconsin soft red winter wheat selections by performing best in relatively cool environments.

Seed supplies of Merrimac are limited due to production stresses during 1988. Amounts allocated will depend upon requests and may be limited to current growers of Argee or Charmany. Please address your requests to Mr. Patrick J. LeMahieu of our Department.

//

Table 1. Grain yields of Argee, Caldwell, and soft red winter wheat selection X1336-8 for 3 years (1986-87-88) at seven locations in Wisconsin.

	Arl. Drill Plots		Mad. Nurs.		Ashland		Lan-caster		Marsh-field		Spooner		St. Bay		7-Location Mean	
	b/a	Rank	b/a	Rank	b/a	Rank	b/a	Rank	b/a	Rank	b/a	Rank	b/a	Rank	b/a	Rank
1986																
Argee	47.7	(6 of 14)	58.2	(10 of 48)	46.5	(11 of 17)	46.5	(10 of 18)	40.3	(11 of 17)	26.6	(9 of 17)	65.1	(5 of 17)	47.3	(3 of 14)
Caldwell	40.5	(11)	55.0	(16)	51.9	(3)	52.2	(3)	40.8	(9)	24.1	(13)	60.0	(7)	46.4	(5)
X1336-8	58.8	(1)	61.4	(1)	51.9	(3)	49.8	(7)	32.6	(17)	26.6	(9)	54.6	(10)	48.0	(2)
															5-Location Mean	
1987															b/a	Rank
Argee	75.5	(3 of 15)	75.8	(29 of 48)	38.1	(3 of 18)	51.1	(7 of 18)			17.8	(8 of 18)			51.7	(4 of 12)
Caldwell	65.8	(13)	84.8	(7)	24.6	(17)	61.0	(2)			18.1	(6)			50.9	(6)
X1336-8	77.1	(1)	78.5	(15)	38.9	(1)	48.6	(12)			19.4	(1)			52.5	(3)
															6-Location Mean	
1988 (Preliminary)															b/a	Rank
Argee	51.6	(12 of 16)	46.8	(41 of 48)	32.4	(13 of 18)	28.9	(11 of 18)	30.5	(16 of 18)			38.0	(14 of 18)	38.0	(14 of 16)
Caldwell	56.6	(7)	55.9	(13)	36.9	(11)	30.7	(7)	40.2	(7)			27.5	(18)	41.3	(10)
X1336-8	51.6	(12)	53.8	(18)	30.4	(16)	24.5	(14)	33.3	(14)			44.2	(5)	39.6	(13)
															Column Mean (3-Years) (nonweighted)	
3-Year Average																
Argee	58.3		60.3		39.0		42.3								45.7	
Caldwell	54.3		65.2		37.8		48.0								46.2	
X1336-8	62.5		64.6		40.4		41.0								46.7	

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Table 2. Grain yields of Argee, Caldwell, and soft red winter wheat selection X1336-8 for 2 years (1987-88) at four locations in Wisconsin. Data from Dr. E. S. Oplinger.

	Arlington	Janesville	Racine	Chilton	4-Location Mean
1987					
Argee	72.3 (15 of 20)	80.5 (15 of 20)	64.1 (10 of 20)	57.9 (10 of 20)	68.7 (16 of 20)
Caldwell	88.4 (2)	105.7 (5)	64.2 (9)	56.5 (12)	78.7 (5)
X1336-8	75.3 (12)	78.7 (16)	65.8 (8)	58.3 (9)	69.5 (15)
1988					
Argee	70.0 (10 of 23)	45.7 (21 of 23)	30.4 (20 of 23)	43.3 (22 of 23)	47.3 (19 of 23)
Caldwell	69.8 (11)	63.3 (6)	38.2 (15)	47.8 (13)	54.8 (9)
X1336-8	70.2 (9)	48.6 (17)	29.5 (21)	48.1 (12)	49.1 (17)
2-year average					8-Test Mean
Argee	71.2	63.1	47.3	50.6	58.0
Caldwell	79.1	84.5	51.2	52.2	66.8
X1336-8	72.8	63.7	47.7	53.2	59.3

Table 3 Agronomic and disease data for Argee, Caldwell, and soft red winter wheat selection X1336-8 for 5 years at Madison (1983-1987) and 2 years (1986-87) in the Arlington drill plots.

	Test wt. lbs.		Head date		Ripe date July	Plant ht. in.		Snap-back 6.0=weak 9.0=stiff	Leaf rust %		Stem rust 0=resis. 9=susc.		Bunt %	Winter surv. %	
	Arl.	Mad.	Arl.	Mad.	Mad.	Arl.	Mad.	Mad.	Arl.	Mad.	Arl.	Mad.	Mad.	Arl.	Mad.
Argee	58.0	58.8	6/3.8	6/4.8	19.0	35.4	39.4	7.8	7.7	3.4	3.0	2.3	36.6	93.0	98.3
Caldwell	58.8	57.3	5/28.5	5/29.5	18.3	28.9	33.8	8.2	10.4	3.5	2.0	1.0	46.4	78.3	92.9
X1336-8	58.8	60.2	6/3.9	6/5.1	19.0	36.2	39.4	7.7	0.7	0.8	0.0	0.0	10.8	93.2	95.7

Table 4. Milling and baking scores for Argee, Caldwell and selection X1336-8 soft red winter wheats.

I. 1987 Uniform Eastern Soft Red Winter Wheat Nursery
[36 entries grown at 11 locations in 9 states]

Selection X1336-8 ranked first for quality among the 36 entries and it was one of only three entries to surpass the Knox 62 standard in baking quality. Low AWRC and high cookie diameter contributed to this high ranking.

II. Wisconsin Quality Scores (Argee as the Standard)

The use of Argee as the "standard" for determination of milling and baking quality of test selections establishes a very high standard. Accordingly, X1336-8 is judged to have very good soft wheat quality:

Qualtiy Scores

	Argee		Caldwell		X1336-8	
	Milling	Baking	Milling	Baking	Milling	Baking
1982 Trips	A	A	A	B	B	D
1983 RRYT	B	A	B	A	B	A
1984 RRYT	A	A	D	C	D	B
1985 RRYT	A	A	C	B	B	C
1986 RRYT	A	A			B	A
1986 Arl.	A	A	B	B	C	A
1987 Trips	A	A	C	B	B	B
1987 Arl.	A	A	C	C	D	C

Selection X1336-8 received milling scores of "D" for below-average flour yield in 1984 and 1987.

1987 CROP UNIFORM EASTERN RED NURSERY
(RANKED BY COMBINED QUALITY SCORE)

VARIETY	1987	1986	1985	1984	1983	1982
WIX 1336-8	1					
KNOX 62	2	13	14	18	9	1
OH 285	3	7				
PACER	4					
PIONEER 2555	5					
COKER 86-38	6					
OH 262	7					
NA-SW-84-345	8					
COKER 86-30	9					
OH 286	10					
IN 79404-G1-26-2	11					
RX 850040	12					
IL 82-2986	13	27				
MD 73065-03	14					
MD 73025-51	15					
COKER 86-35	16					
LINCOLN	17	15	7			
PS 840061	18					
IN 77249-RC1-133-3	19					
TWAIN	20	24	30			
MD 73019-28	21					
COKER 9733	22					
AGC-107	23					
AR 42263-8	24					
DYNASTY	25	5				
OASIS	26	22	22	14	4	18
KY 83-60	27	20				
NA-SW-84-157	28					
AGC-108	29					
AR 74107-F11-4	30					
IL 83-3298	31					
IL 81-3737	32					
MD 75191-80	33					
IN 771454-C1-2-9	34					
PS 840024	35					
TRUMBULL	36	32	35	34	28	25

14E. Exhibit E, Statement of the Basis of Applicant's Ownership.

"This is the certify that I have been duly appointed as agent of the applicant. The applicant, the Wisconsin Agricultural Experiment Station, is the sole owner of Merrimac wheat."

Robert A. Forsberg

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